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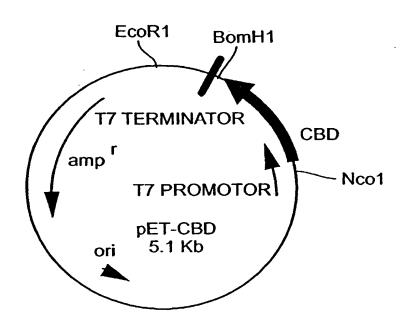


Fig. 1a

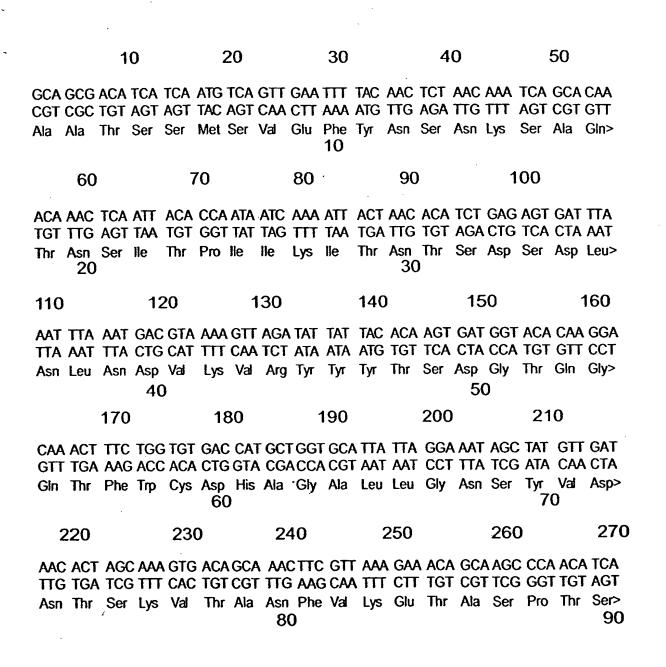


Fig. 1b

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Fig. 1c

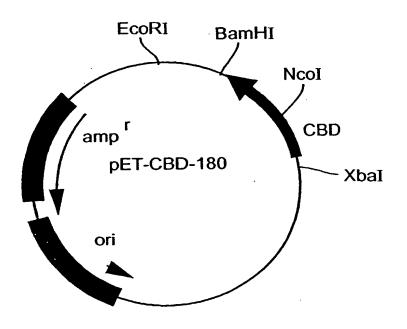


Fig. 1d

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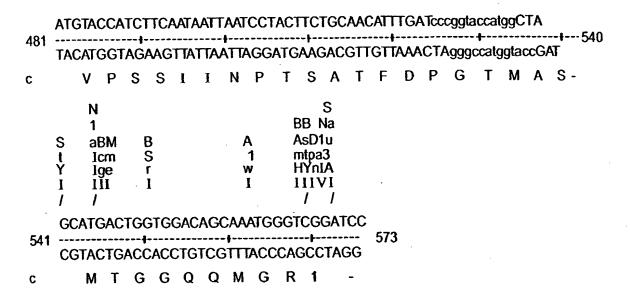


Fig. 1g

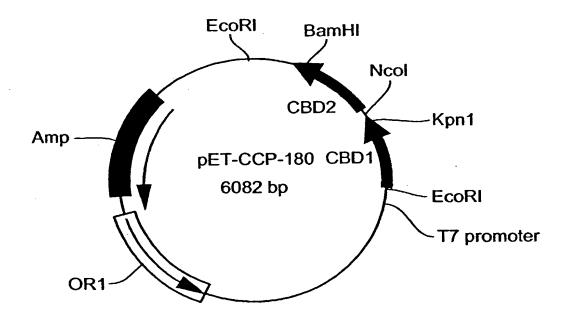


Fig. 2a Map of pET-CCP

#### MAP OF CCP CCP = CBD CROSS LINKER PROTEIN, CONTAIN TWO CBDs **FUSED TOGETHER.** N 1 ET cFs a osp RiE I III CCATGTCAGTTGAATTcTACAACTCTAACAAATCAGCACAAACAAACTCAATTACACCAA GGTACAGTCAACTTAAgATGTTGAGATTGTTTAGTCGTGTTTGTTTGAGTTAATGTGGTT MSVEFYNSNKSAQTNSITPI-**MDFSs** MDS Srswp SIW eaiaE eaa HI TAATCAAAATTACTAACACATCTGACAGTGATTTAAATTTAAATGACGTAAAAGTTAGAT I K I T N T S D S D L N L N D V K V R Y-MT Ν R ATTATTACACAAGTGATGGTACACAAGGACAAACTTTCTGGTGTGACCATGCTGGTGCAT TAATAATGTGTTCACTACCATGTGTTCCTGTTTGAAAGACCACACTGGTACGACCACGTA YYTSDGTQGQTFWCDH AGAL-C R m TATTAGGAAATAGCTATGTTGATAACACTAGCAAAGTGACAGCAAACTTCGTTAAAGAAA ATAATCCTTTATCGATACAACTATTGTGATCGTTTCACTGTCGTTTGAAGCAATTTCTTT L G N S Y V D N T S K V T A N F V K E T-Fig. 2b

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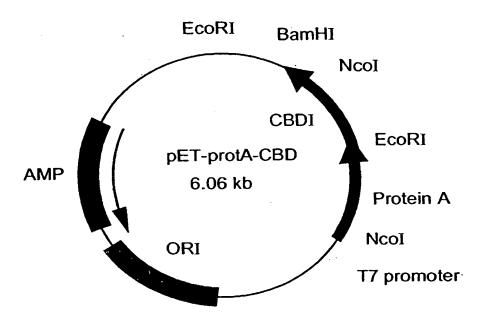


Fig. 3a Map of pET-protA-CBD

Map of protA-CBD July 15, 1996 17:31 S a В d Av sDNSa asctI JaoyI HIII CCATGGAACAACGCATAACCCTGAAAGAAGCTTGGGATCAACGCAATGGTTTTATCCAAA GGTACCTTGTTGCGTATTGGGACTTTCTTCGAACCCTAGTTGCGTTACCAAAATAGGTTT MEQRITLKEAWDQRNGFIQS-C C PM MA u D 1i 3 p Αn ee II GCCTTAAAGATGATCCAAGCCAAAGTGCTAACGTTTTAGGTGAAGCTCAAAAACTTAATG K D D P S Q S A N V L G E A Q K L N D C S В C AvMf s sh uJ pa ACTCTCAAGCTCCAAAAGCTGATGCGCAACAAAATAACTTCAACAAAGATCAACAAAGCG TGAGAGTTCGAGGTTTTCGACTACGCGTTGTTTATTGAAGTTGTTTCTAGTTGTTTCGC SQAPKADAQQNNFNKD QQSA С N H aN Ιs H CCTTCTATGAAATCTTGAACATGCCTAACTTAAACGAAGCGCAACGTAACGGCTTCATTC GGAAGATACTTTAGAACTTGTACGGATTGAATTTGCTTCGCGTTGCATTGCCGAAGTAAG FYEIL N M P N L N E A Q R N G F I Q Fig. 3b

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Fig. 3c

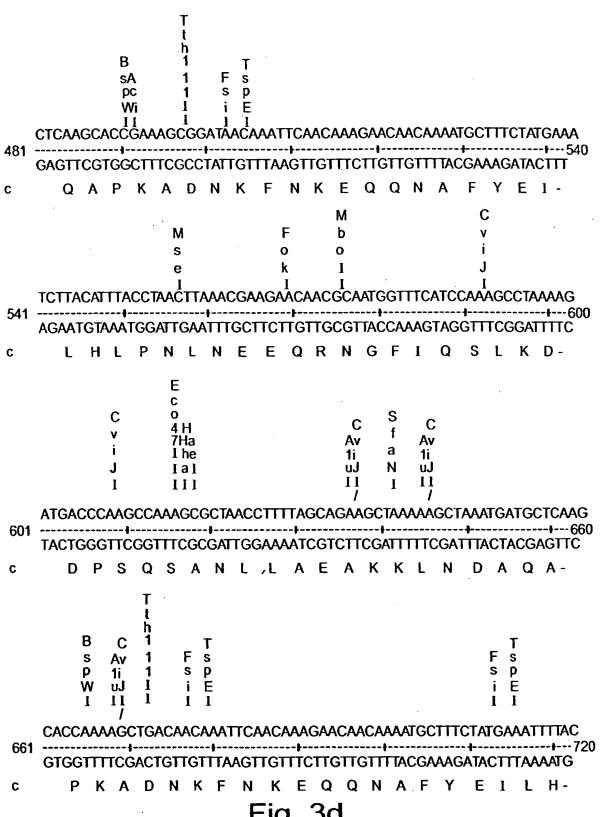


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С	Α	S S	S	T	Р	٧ ،	V N		K	٧	T	G	Υ	I	G	6 (	3 /	A K -	•
	m		n		Α.	•	BB I AsD1	Na											
	S	RS sc	R s		A 1		mtpa:	3						_	<b></b>		_	_	
		a I	a I		W I		HYnL	[						ł	Fig	}.	<b>3</b> 1	Γ	
,	AAGTA	CTTG	GTA(	CAG	CACC	ATA	GGAT	ćс											
					,														

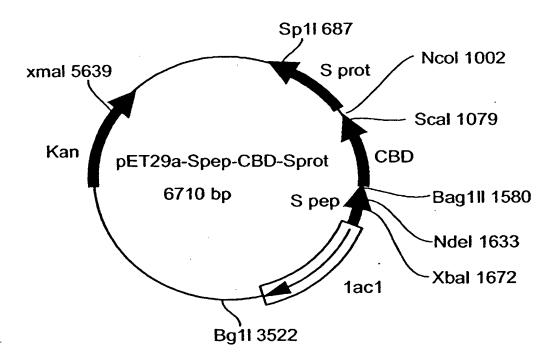
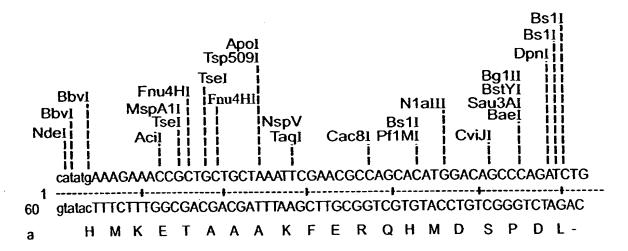


Fig. 4a Map of pET29-Spep-CBD-Sprot

Fig. 4b

Map of: S peptide-CBD-S protein

November 10, 1999 14:34



	Fnu4HI
NgoGV	Tsel !
N1aIV	Tsel   N1alli
Banl	Bael
ScrFI   BsaJI   I	BsaJI

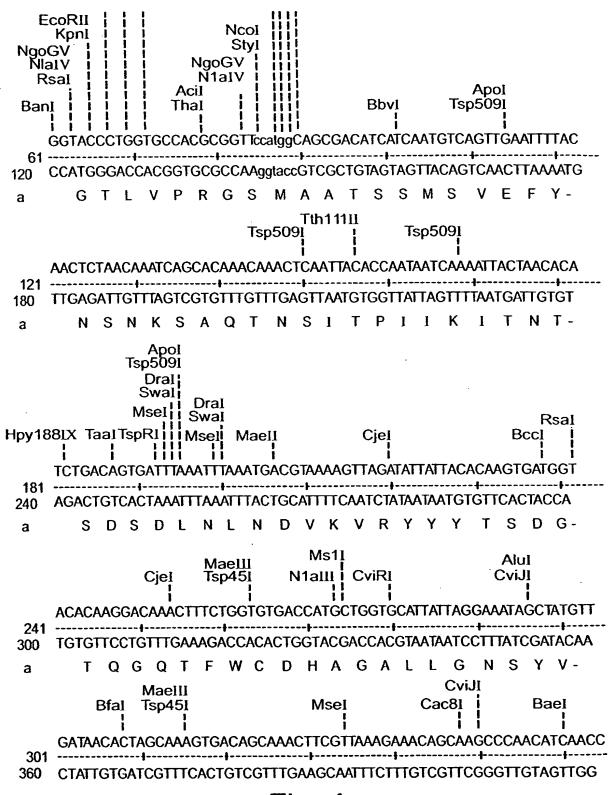


Fig. 4c

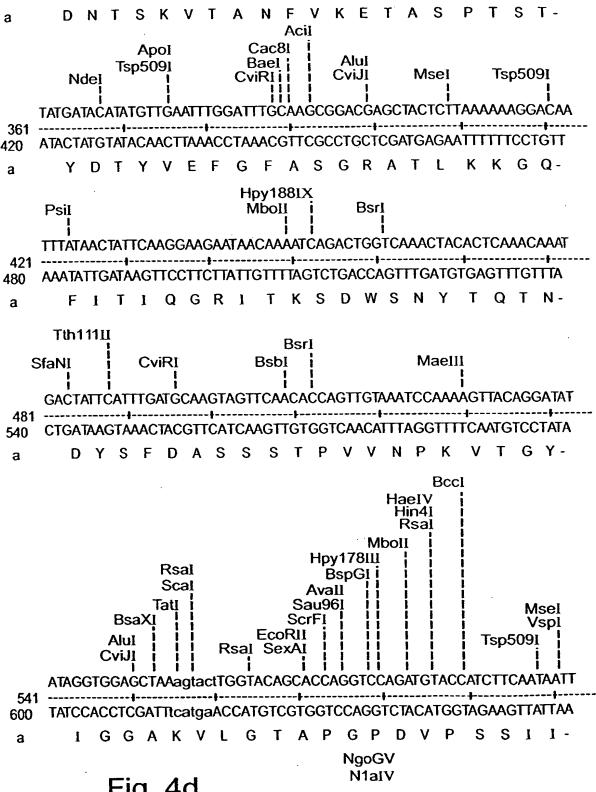
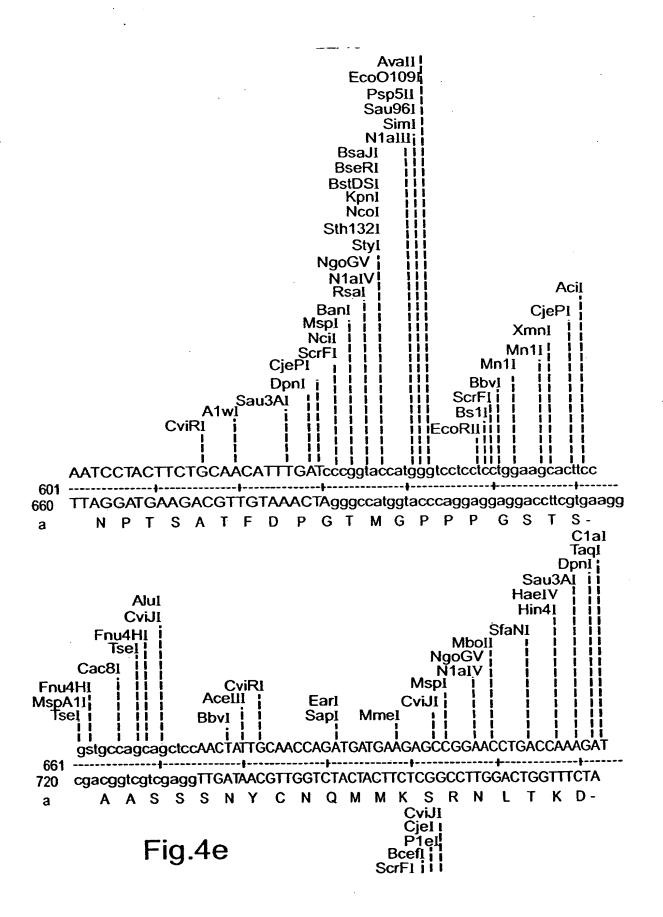
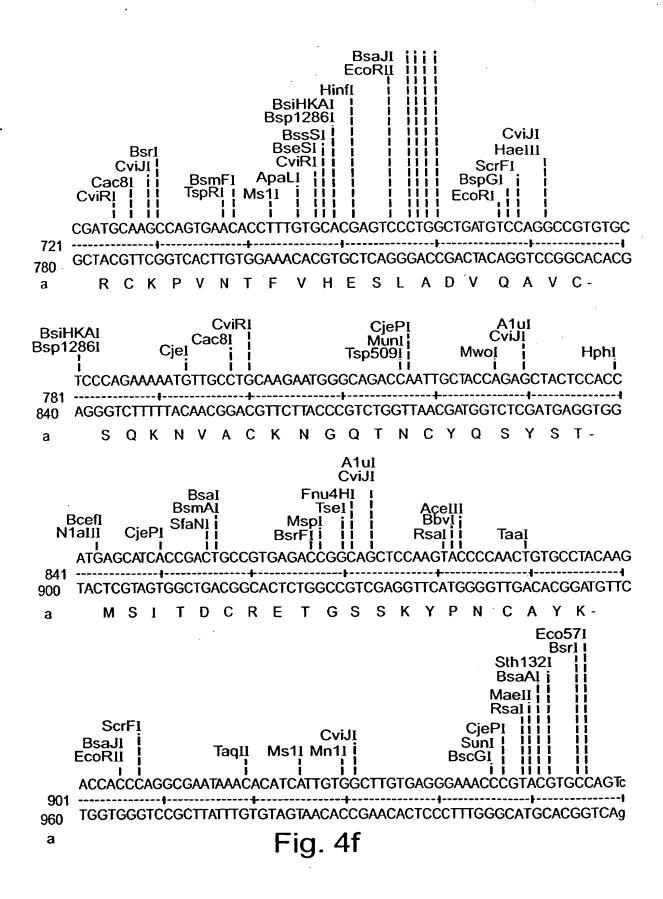
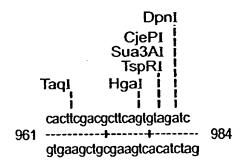


Fig. 4d





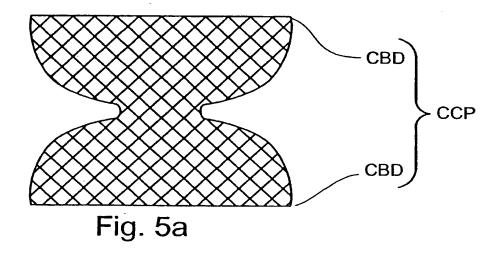
a TTQANKHIIVACEGNPYVPV-



a HFDASV\*I-

Fig. 4g

CBD = Cellulose binding domain CCP = Cellulose cross - linking protein PSU = Polysaccharide structural unit



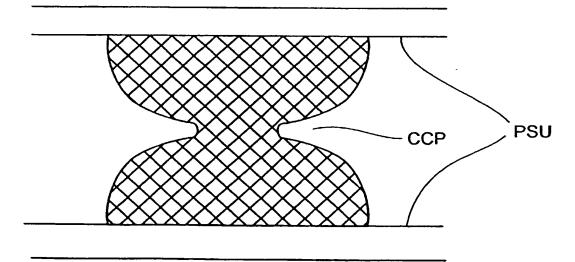


Fig. 5b

CBD = Cellulose binding domain

LU = Linker unit

CU = CBD coupler unit

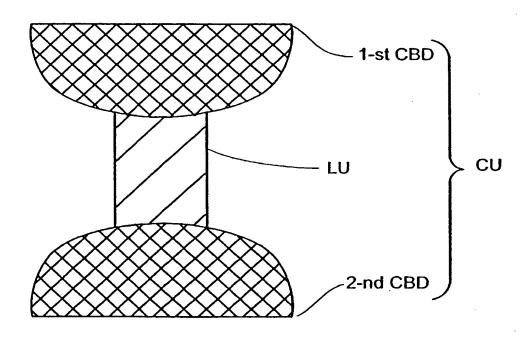
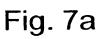


Fig. 6





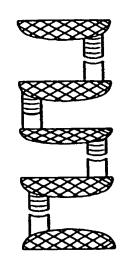


Fig. 7b

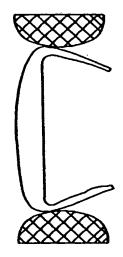


Fig. 7c



= CBD



= STARCH BINDING DOMAIN



= STARCH



= JUN



= FOS



= LARGE PROTEIN MOIETY

KEY:
CBDF = CBD functional moiety
CBD = Cellulose binding domain
CU = Functional moiety

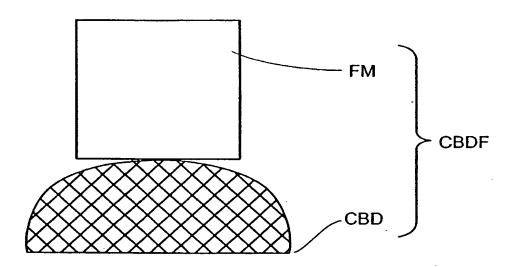


Fig. 8

PSU = Polysacharide unit

CBD = Cellulose binding domain

LU = Linker unit

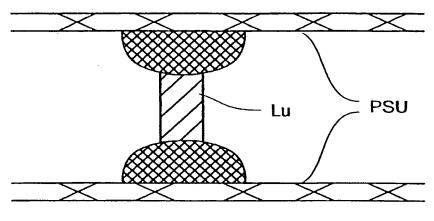
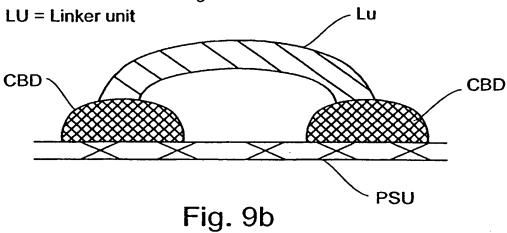


Fig. 9a

KEY:

PSU = Polysacharide unit

CBD = Cellulose binding domain



KEY: PSU = Polysacharide unit CBD = Cellulose binding domain LU = Linker unit PSU PSU CBD CBD CBD' Lu · Lu CBD PSU CBD Lu CBD PSU

Fig. 9c

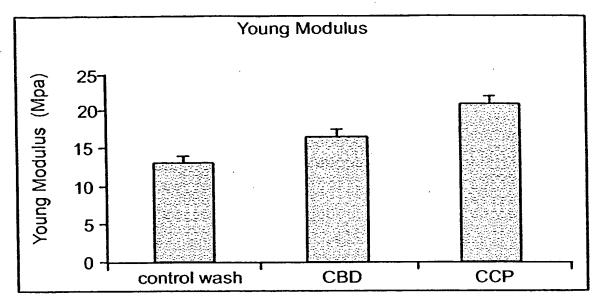


Fig. 10a Young Modulus of CBD and CCP treated papers

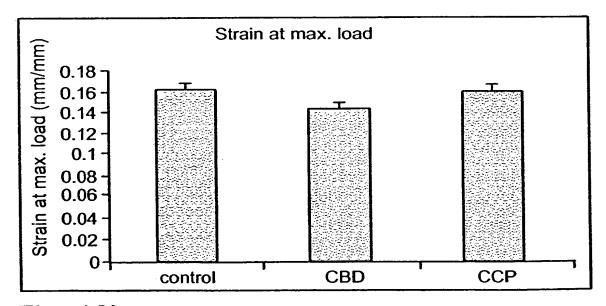


Fig. 10b Strain at maxium load of CBD and CCP treated papers

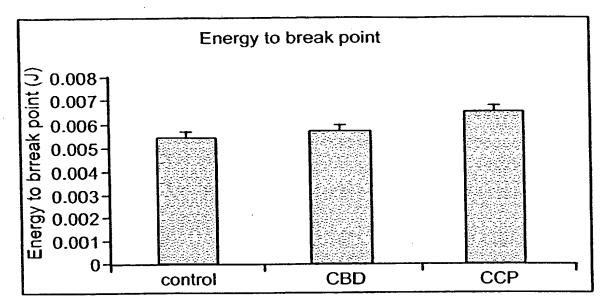


Fig. 10c Energy to break points of CBD and CCP treated papers

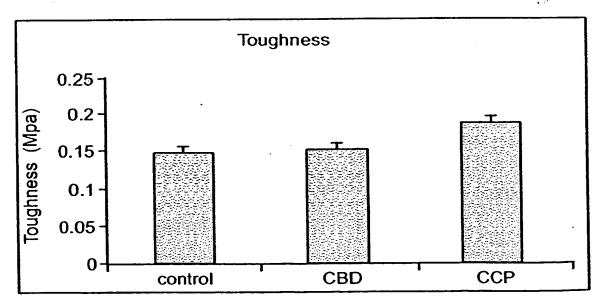


Fig. 10d Toughness of CBD and CCP treated papers

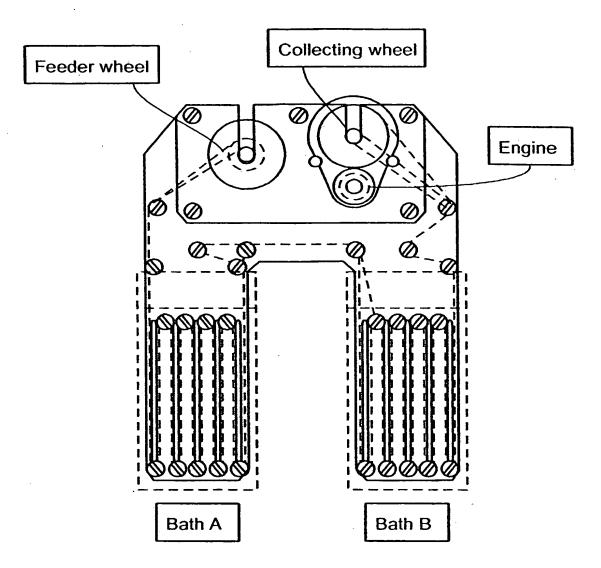


Fig. 11 Yarn treatments

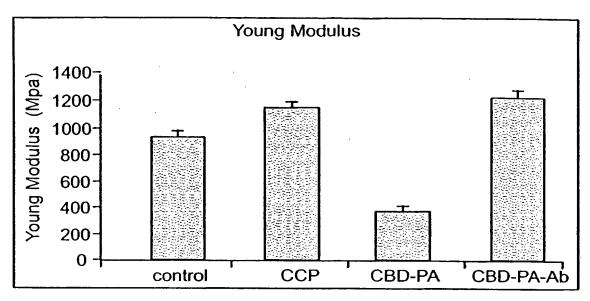


Fig. 12a Young modulus of CCP, CBD-PA and CBD-PA-Ab treated cotton yarn

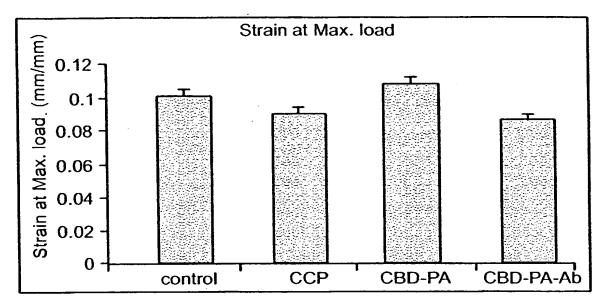


Fig. 12b Strain at maximum load of CCP, CBD-PA and CBD-PA-Ab treated cotton yarn

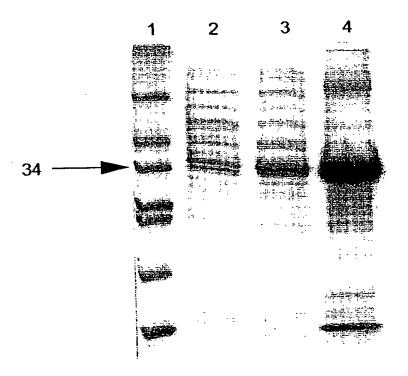


Fig. 13

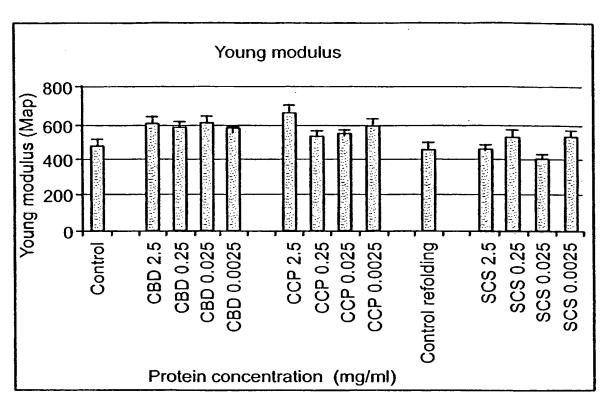


Fig. 14 Young modulus of CBD CCP and SCS treated Whatman papers.

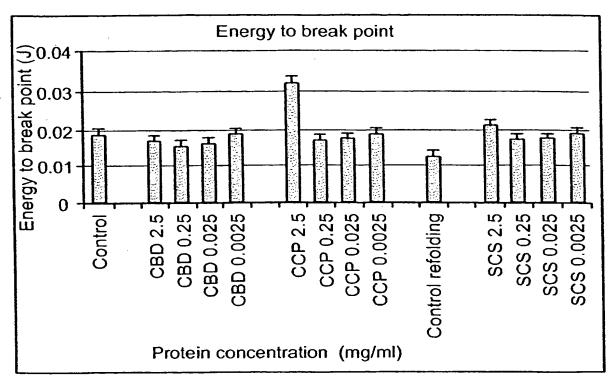


Fig. 15 Energy to break points of CBD CCP and SCS treated Whatman papers.

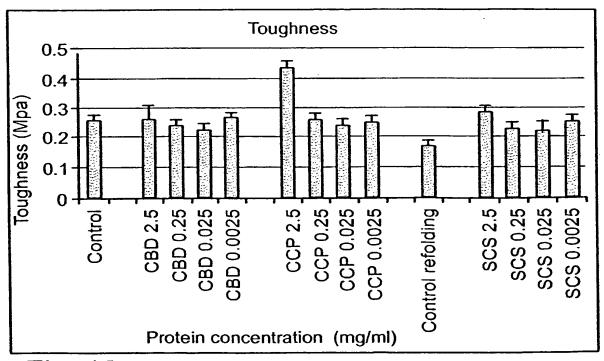


Fig. 16 Toughness of CBD CCP and SCS treated Whatman papers.

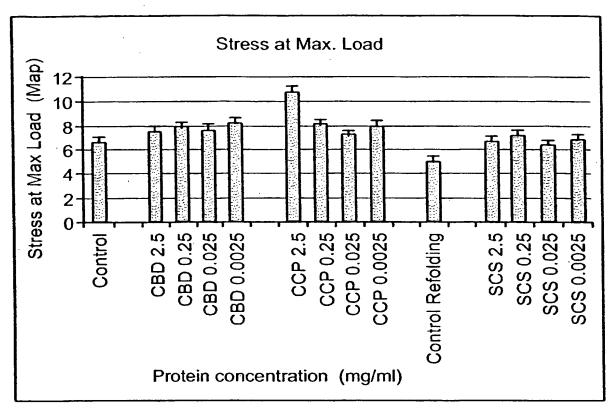
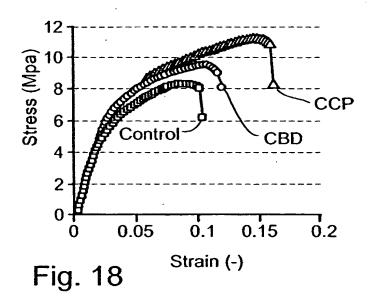


Fig. 17 Stress at maximum load of CBD CCP and SCS treated papers. All treatments increased the Stress at maximum load of Whatman papers, which demonstrates an increase to the strength of the paper.



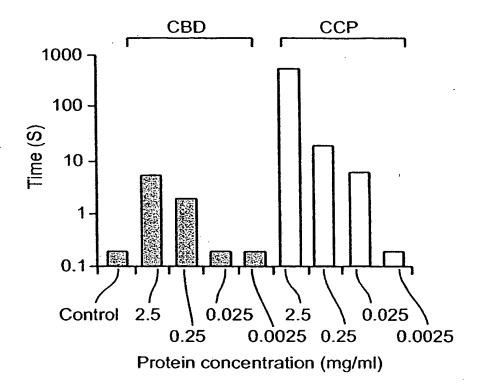


Fig. 19

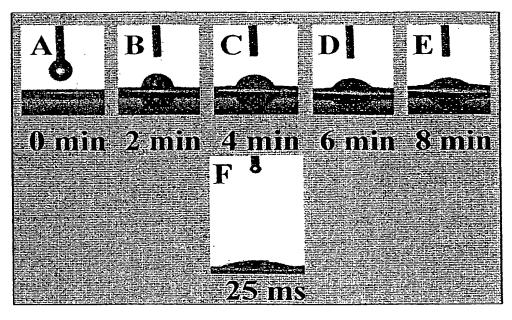


Fig. 20